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Neu eingegangene Arbeiten

L. Neumann, Aus den Forschungslaboratorien Erlangen der Siemens AG:
Magnetische Systeme mit Inhomogenitäten (Inhomogeneous Magnetic Systems)

Within the molecular-field approximation the Gibbs free energy σ is calculated for a system with inhomogeneous distribution of magnetic particles. Some properties of such a system derivable from σ are compared with magnetic and calorimetric measurements on $Ce_{1-x}Gd_xRu_2$ alloys.

W. R. McMurray and I. J. van Heerden, Southern Universities Nuclear Institute, Faure, Cape, South Africa:
The Level Structures of the Nuclei ^{232}Th and ^{238}U

Time-of-flight gating techniques have been used to study the decay γ-rays from states excited by inelastic scattering of neutrons from ^{232}Th and ^{238}U. Neutron energies up to 1900 MeV have been used. From accurate determinations of the γ-ray energies, intensities and thresholds, detailed level and decay schemes have been obtained for ^{232}Th and ^{238}U. New levels in both nuclei are observed at larger excitations than before and the present work is incompatible with some previously accepted spin and collective band assignments derived from Coulomb excitation studies.

S. Högberg, R. Jadrny, S.-E. Karlsson, G. Malmsten, and Ö. Nilsson, Institute of Physics, University of Uppsala, Uppsala, Sweden:
Relative Internal Conversion Electron Intensities of the 113 keV Transition in ^{177}Hf

The intensities of the internal conversion lines of the 113 keV $M1+E2$ transition in ^{177}Hf have been measured. From comparison with theoretical conversion coefficients the transition has been found to be $(95.2\pm0.5)\%$ $E2$ corresponding to $|\delta|=4.5\pm0.3$. The theoretical L_I and M_I conversion coefficients used in the comparison have been increased by 5% according to the result that for pure $E2$ transitions in the deformed region the L_I/L_{II}, L_I/L_{III}, M_I/M_{II} and M_I/M_{III} theoretical ratios are too low ($\sim$5%). Moreover, the present result indicates that the L_{II}/L_{III} and M_{II}/M_{III} ratios obtained from the tabulations by Hager and Seltzer and from the computer program by Pauli are too high (1–2%).

F. E. Wagner, H. Spieler, D. Kucheida, and P. Kienle, Physik-Department, Technische Universität München, Garching,
R. Wäppling, Institute of Physics, University of Uppsala, Uppsala, Sweden:
Mössbauer Studies and Nuclear Quadrupole Moments of $^{186, 188, 189, 190}$Os

Mössbauer transmission experiments with the 137, 155, 69 and 187 keV gamma rays of $^{186, 188, 189, 190}$Os, respectively, yielded the electric quadrupole splitting of these gamma resonance lines in OsO_2 and OsP_2. From the results the following ratios of quadrupole moments were derived: Q_{2+}(^{186}Os, 137 keV): Q_{2+}(^{188}Os, 155 keV): Q_{2+}(^{190}Os, 187 keV): $Q_{3/2-}$(^{189}Os, g.s.)$=(+1.100\pm0.020)$: 1.0: $(+0.863\pm0.051)$:

(-0.584 ± 0.011) and $Q_{5/2^-}(^{189}\text{Os}, 69\text{ keV})/Q_{3/2^-}(^{189}\text{Os}, \text{g.s.}) = -0.735 \pm 0.012$. The ratios for $^{186, 188, 190}$Os are, within their limits of error, in agreement with the expectation of the rotational model, indicating that the pairing-plus-quadrupole model calculations of Kumar and Baranger predict too rapid a transition from rotational to vibrational nuclei. Applying this argument to ^{186}Os in particular and using the measured ratios, one obtains a set of values for the quadrupole moments themselves, namely $Q_{2^+}(^{186}\text{Os}) = -(1.50 \pm 0.10)$ b, $Q_{2^+}(^{188}\text{Os}) = -(1.36 \pm 0.09)$ b, $Q_{2^+}(^{190}\text{Os}) = -(1.17 \pm 0.08)$ b, $Q_{3/2^-}(^{189}\text{Os}) = +(0.80 \pm 0.06)$ b, and $Q_{5/2^-}(^{189}\text{Os}) = -(0.58 \pm 0.05)$ b. For the electric field gradient at Os nuclei in Re metal a value of $V_{zz} = -(3.3 \pm 0.6) \cdot 10^{17}$ V/cm^2 was found. A measurement with a magnetically split source yielded $\delta = 0.685 \pm 0.025$ for the $E2/M1$ mixing parameter of the 69 keV transition of ^{189}Os, $g_{5/2^-}/g_{3/2^-} = 0.895 \pm 0.006$ for the ratio of the g-factors of the 69 keV state and the groundstate, and $H_i = -(1135 \pm 15)$ kOe for the hyperfine field at Os nuclei in an iron matrix.

W.-D. Schmidt-Ott, J. C. McGeorge, and R. W. Fink, School of Chemistry, Georgia Institute of Technology, Atlanta, Ga., U.S.A.:

Multipolarity Determination from L X-Ray Spectra in the Decays of ^{227}Th, ^{243}Am, and ^{249}Cf

A new method to determine the multipolarity of a converted γ-transition from its L x-ray spectrum has been extended to a coincidence method and applied in the complex decays of ^{227}Th, ^{243}Am, and ^{249}Cf. The L x-ray spectra of four low energy transitions have been measured in coincidence with cascading high energy γ-rays and their $M1$–$E2$ mixing ratios obtained by comparison with calculated L x-ray line intensities. The following results were obtained: for the $3/2^+ \rightarrow 1/2^+$ ground-state transition in ^{223}Ra, an admixture of $(74 \pm 12)\%$ $E2$, for the $7/2^+ \rightarrow 5/2^+$ ground-state transition in ^{239}Np, less than 30% $E2$, for the $9/2^+ \rightarrow 7/2^+$ ground-state transition in ^{245}Cm, $(63 \pm 10)\%$ $E2$, and for the $11/2^- \rightarrow 9/2^-$ transition in the third rotational band in ^{245}Cm, $(32 \pm 10)\%$ $E2$.

I. Broser und M. Schulz, Institut für Elektronenmikroskopie am Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin-Dahlem und III. Physikalisches Institut der Technischen Universität Berlin:

Untersuchung der Breite der ESR-Signale von Cu^{2+} in ZnO-Kristallen (ESR Line Width Study on Cu^{2+} in ZnO Crystals)

On copper doped ZnO-crystals the angular, doping and temperature dependence of the ESR line width has been investigated. The measurements on different conventionally and radiochemically doped ZnO-crystals show the strong influence of the perfectness of the crystals on the line width. By the measured temperature dependence of the line width is deduced, that the spin-lattice relaxation mechanism between 7 and 17 °K is a Raman process.

A. Aehlig, E. Hörber, D. Kuscheck und M. Scheer, Physikalisches Institut der Universität Würzburg:

Elastische Elektronenstreuung im Energiebereich 100–150 keV (Elastic Scattering of 100 to 150 keV Electrons)

The angular dependence of elastic scattering of 100 to 150 keV electrons has been measured for scattering angles of 5° to 165°. The atomic numbers of the scattering atoms were 6 and 79. Within the experimental errors (few per cent) we found agreement with the results of the calculations of Lin.

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